

INSTRU for Pailla

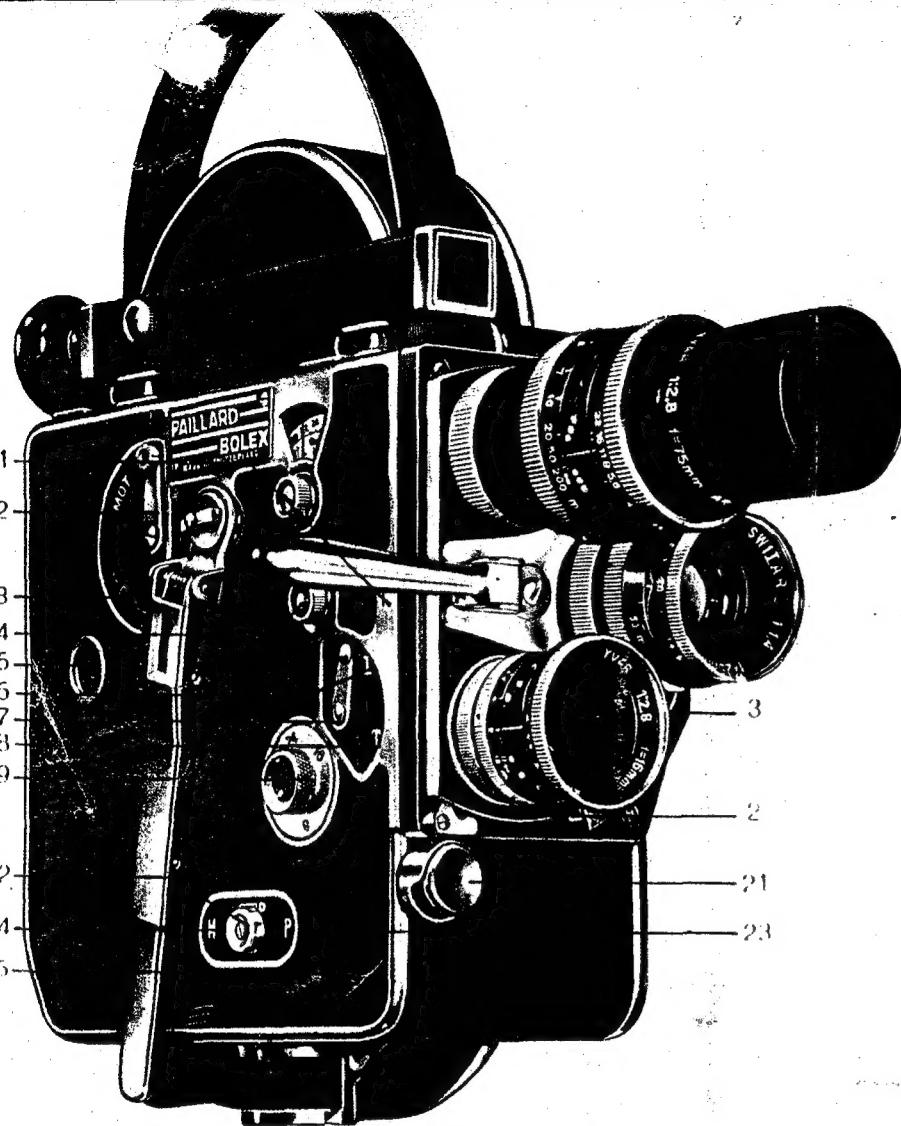


Fig. 2. Bolex H 16 Standard Movie Camera.

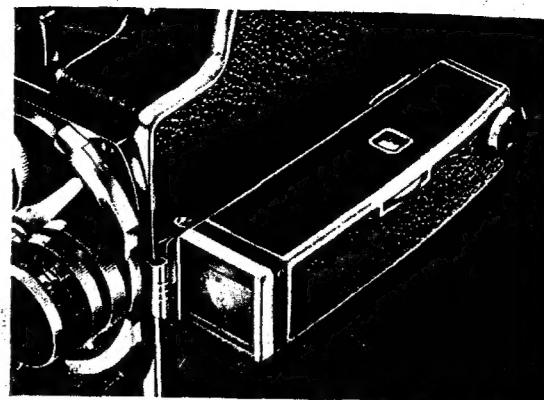


Fig. 3. Octameter Viewfinder

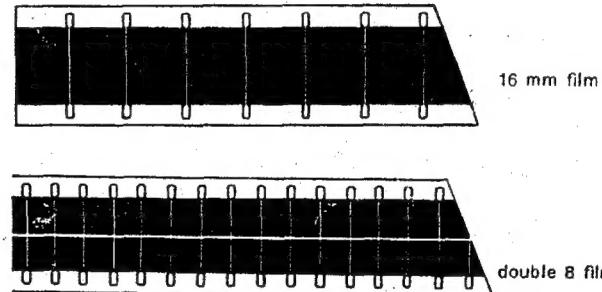


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INSTRUCTION MANUAL

for Paillard-Bolex H cameras

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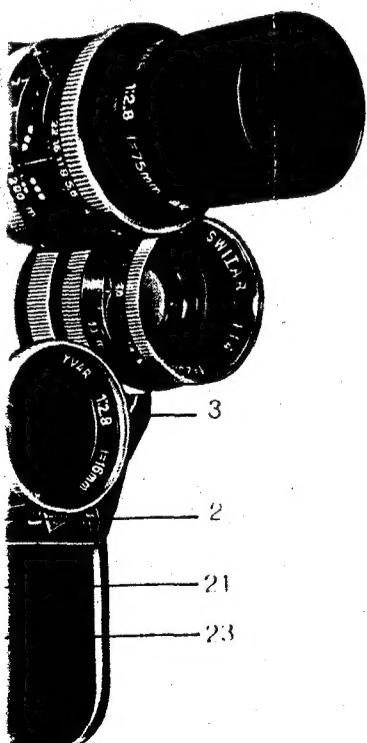


Fig. 3. Octameter Viewfinder

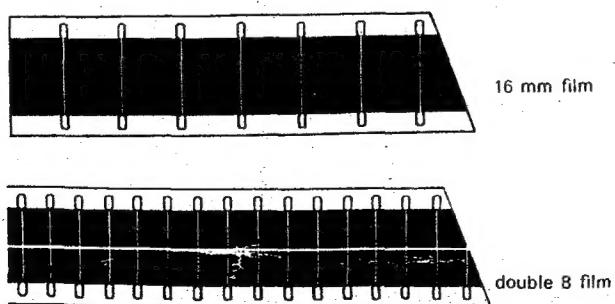


Fig. 4

26 Shooting a film

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36 Servicing and Repairs**Foreword**

You have just acquired a Paillard-Bolex H motion picture camera. The name of Paillard-Bolex is considered all the world over as a hallmark of technical perfection and precision craftsmanship. Before leaving the factory, your camera was checked over and adjusted with meticulous thoroughness.

Like any other precision instrument, your camera should be treated with the utmost care. Always remember that any one of the countless Paillard-Bolex distributors the world over will be glad to advise you as to how to get the best out of your Bolex H camera, which can match the performance of the finest professional cameras.

Equipment

Each Bolex H camera is supplied with at least one lens and the following accessories:

- 1 rewinding handle (25)
- 1 hand crank
- 2 lens hole stoppers for turret
- 1 flat-headed screw for covering prism
- 1 eyepiece for focusing on groundglass (only supplied if camera is not fitted with Eye-Level Focus).

H16 camera:

- 2 empty take-up spools (100 ft. and 50 ft. capacity)
- 1 filter holder

H8 camera:

- 3 empty take-up spools (capacity 25 ft., 50 ft. and 100 ft.).

The spools for double-run 8 mm film have round spindle holes with notch and are marked I and II on the side, whereas the 16 mm spools have square spindle holes and are unmarked.

Preliminary directions:

- Read this Instruction Manual through carefully and get to know your camera thoroughly; this will help you to avoid mistakes and consequent wastage of film.
- Never run the camera at a speed higher than 32 frames per second unless it is loaded with film, as otherwise the mechanism may be damaged.
- Never attempt to rewind the spring motor unless lever (12) is on MOT.

Loading of Camera

Always load your camera in a shady spot; in this way, you will avoid the light getting in and fogging the edges of the film.

Previous to loading.

1. Make sure that the operating button (22) on the side of the camera is set to STOP (Fig. 2), the clutch lever (12) is on MOT and the speed control (19) set to 16 or 24 frames per second, i.e. that the figure 16 or 24 is opposite the red mark.
2. Wind up the motor fully by means of handle (25). Cease winding as soon as the stop is reached.
3. Turn knob (43) (Fig. 9) towards "O" by means of its ring and remove the lid from the camera.
4. Push down lever (37) into the vertical position (as shown in Fig. 8). This closes the loop guides (31 and 39).
5. Make sure that pins (33, 34 and 36) are lodged in their respective holes.
6. Place the spool of film on the upper spindle (29) so that the film will unwind in the direction shown by the arrow (Fig. 5).
7. The end of the film must be cut slantwise (see Fig. 4) *between two perforations* to ensure that it will pass properly through the automatic loading device and film drive mechanism. To cut the end to shape, insert it in the cutter (41) (Fig. 5) and press hard on blade (42).

Be careful to eject the piece of snipped-off film from the camera.

Automatic loading.

8. Press on the filming button (21) at front of camera, at the same time inserting the end of the film fully into opening (30) (Fig. 8).
9. Maintain pressure on filming button (21) until about 10" or a foot of film has emerged from the lower sprocket (38).
10. Open the loop guides (31 and 39) by pushing up lever (37).
11. Insert the end of the film into the slit in the core of the take-up spool, wind the film onto the spool (about 3 turns) and place the latter on the lower spindle (40).
12. Turn the spool by hand in the direction shown by the arrow in order to tighten the film on the core and take up any slack. Then run the

camera for a second or two to make certain that the film winds correctly onto the take-up spool.

13. Replace the lid on the camera and lock it in position by turning the locking ring (43) towards "F". If any difficulty is experienced in replacing the lid, do not force it, but make sure that the loop guides are open and that pins (33, 34 and 36) are properly home in their respective holes.

In case of incorrect loading, remove the film by cranking the camera in reverse (see page 9) and repeat the loading operations again with care.

Film check on H8 cameras.

Bolex H8 cameras are fitted with a film check which prevents the film on both spools from uncoiling during loading and after the film has been exposed.

Before inserting the spools in the camera, open both arms (45 and 46) completely (position c, Fig. 10). Hold the full spool tightly to prevent the film from uncoiling and set it on its spindle (29), with the notch at the centre of the spool facing the red mark on the spindle. When the spool is in place, slightly raise pin (47) and regulate the position of arm (45) according to the spool capacity.

For 25 ft. spools, use position a
" 50 ft. " " " b
" 100 ft. " " " c

After automatically loading the film, adjust the position of lower arm (46) in the same way.

When unloading the camera, take hold of the full take-up spool tightly to prevent the film from uncoiling, then open arm (46) completely (i.e. to position c) before extracting the spool (see page 11, last paragraph).

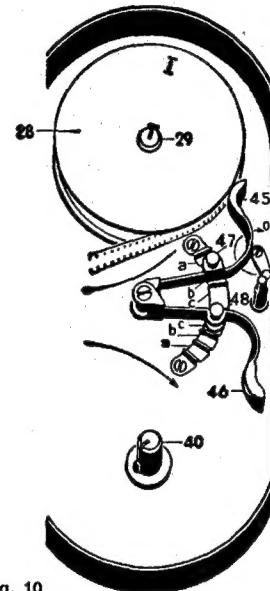


Fig. 10

Film Drive Mechanism

Footage counter.

The footage counter (15) (in feet or metres) returns to the beginning ('A' on the scale) automatically as soon as the lid of the camera is removed and only starts registering when the latter is replaced. The part of the scale between 'A' and '0' corresponds to the passage of about 4 ft. of film, in other words of the 'leader' which preserves the coils of film underneath from fogging while the camera is being loaded. Press on the filming button (21) until the cipher '0' appears under the red dot on the dial window. Shooting may now begin.

The footage counter automatically registers the length of film exposed.

An audible signal (clicking sound) marks the passage of each 21 cm (about 8") of film. Thus the operator can estimate the footage used to record a scene without looking away from the viewfinder. A normal scene shot at 16 frames per second corresponds to about 4-6 consecutive clicks.

To soften the sound of the audible signal or silence it altogether, push the small lever (49) (located inside the camera, alongside pin (44) of the counter—see Fig. 11) towards '0'.

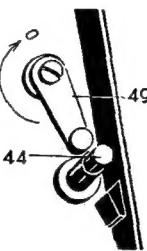


Fig. 11

Frame counter.

The frame counter will be found particularly useful for shooting films of a scientific character, for producing various kinds of trick effects (fades, lap dissolves and so on) and for filming still subjects of all kinds frame by frame (animated cartoons, puppet films, etc.).

Upper dial—The upper dial adds the frames in forward motion and subtracts them in reverse motion. It is graduated: from 0 to 50 frames (Bolex H16 cameras).

from 0 to 100 frames (Bolex H8 camera).

Lower dial—The lower dial totalizes the frames in forward motion and subtracts them in reverse motion. It is graduated: in 50's up to 1000 frames (Bolex H16 cameras). in 100's up to 2000 frames (Bolex H8 camera).

Beyond these figures, the cycle starts again and the totals shown by both dials must be added to the 1000 (or 2000) frames already totalized. *Do not pay attention to the positions of the disks with respect to one another, but only to the figures shown on the dials.*

It is easy to check at any time whether the frame counter readings refer to a first or second cycle by merely consulting the *footage counter*. Remember that:

1000 frames of 16 mm film correspond to 25 ft. (7.62 m) of film
2000 frames of 8 mm * film correspond to 25 ft. (7.62 m) of film
or in other words:

1 metre of 16 mm film contains 131.23 frames.

1 metre of 8 mm * film contains 262.46 frames.

* The figures given for 8 mm film refer only to one row of frames on double-run 8 mm film.

Setting frame counter back to zero.

First set the "units" dial (upper dial) back to zero by turning the knob on the handcranking spindle 14.

Then set the "totalizer" dial (lower dial) back to zero by turning the milled knob just below the two frame counting dials.

Filming speeds.

Control knob (19) regulates the filming speed from 8 to 64 frames per second. The filming speed can be altered even when the camera is running. Never run the camera at a higher speed than 32 frames per second unless there is a film in it, or the mechanism may be damaged. The normal filming and projection speed is 16 frames per second in the case of films intended for silent projection, and 24 frames per second in the case of films to which a sound track is to be added later on.

Films shot at a speed lower than the subsequent projection rate produce an impression of accelerated motion on the screen, while films shot at a faster speed give rise to a slow-motion effect.

Dependence of diaphragm setting on filming speed.

It must be borne in mind that altering the filming speed alters the time during which each frame is exposed. At 16 frames per second (the normal filming speed for silent films), the exposure time is 1/40th second.

When filming at 8 frames per second, this exposure time is doubled, becoming 1/20th second, whereas when the camera is run at 64 frames per second, for instance, it is reduced to a quarter, i.e. to 1/160th second. This fact must be taken into account when setting the lens diaphragm (see page 25).

E.g.: filming speed 16 f.p.s., diaphragm setting f:5.6

"	8	„	set diaphragm to	f:8
"	32	„		f:4
"	64	„		f:2.8

When in doubt, consult the Bolex Exposure Table.

Use of Operating Controls

The filming button (21) in front of the camera is used for intermittent running (usual method).

The operating control (22) at the side of the camera is used for continuous running and for making single exposures frame by frame.

Intermittent running: Press on filming button (21); the camera stops running as soon as pressure ceases.

Continuous running: Push control (22) fully towards 'M' (24). To stop the motor, push control back on 'STOP'.

Frame by frame operation: Push control (22) fully towards 'P' (23). This has the effect of exposing one frame only.

For snapshot exposures, first check that lever (17) is in position 'I' (16). To make time exposures, set lever (17) to 'T' (18).

Use of cable release.

A cable release, supplied on request, can be used to run the camera either intermittently or frame by frame. It is available in three different lengths:

18"	Code: DECLA
20" (for use with tripod)	„ DETRE
40"	„ DELON

This accessory is used more especially with the "Surefire Grip" (Code: STAIC) and Bolex Pan-Head Cine Tripod (Code: PODOM) and helps the operator to keep the camera perfectly steady while filming.

Handcranking in reverse.

The Bolex H camera can be run in reverse motion by means of a small auxiliary hand crank, *for the purpose of winding back the film in reverse*. Thus the movie-maker can easily withdraw a partially-exposed film from the camera or produce a variety of original effects, such as lap dissolves, superimpositions and so on.

1. Push the clutch lever (12) to '0', thus disengaging the spring motor. If any resistance is felt in doing so, do not exert force, but press on filming button (21) while continuing to push down lever (12).

2. Set the side control (22) to 'M'.
3. Screw the dust cap on the taking lens to avoid exposing the film in reverse.
4. Fix the hand crank on spindle (14) of the frame counter unit, taking care that the pin engages in the notch in the handle.
The speed control should preferably be set to 8 frames per second.
5. Rewind the film by turning the crank in the direction shown by the engraved arrow. Then set the side control (22) to 'STOP' and put the clutch lever back on 'MOT'.
Do not attempt to rewind the film faster than the governor will permit.

Electric motor drive.

The Paillard-Bolex Electric Motor, Type U-62, can also be used to run the Bolex H camera when the spring motor is disengaged. The Type U-62 Motor (supplied on request, ordering code: MOSTE) can be run off standard dry batteries or off the house lighting current.

Unloading the Camera

Standard 16 mm and 8 mm films terminate with a 'trailer' about 4 ft. long to permit of unloading without fogging the film.

As soon as the film is entirely exposed—which can be ascertained by reading the footage counter—run the motor a few more seconds to ensure that the whole of the trailer has been wound onto the take-up spool.

Checking absence of film in gate.

Before removing the lid from the camera, make certain that no film is left in the gate, as follows:

Push lever 17 down on 'T' (18), rotate the lens turret a half-turn so as to uncover the taking aperture, then push the lateral control (22) towards 'P' (23) to clear the shutter from the gate. If any film is left in the gate (readily visible as an ivory-coloured rectangle), only a single frame will be fogged as a result of this inspection.

Open the camera, preferably in the shade, remove the full spool of exposed film and stow it away immediately in its metal container.

Special notes on double-run 8 mm film.

The Bolex H8 camera takes 25 ft., 50 ft. or 100 ft. spools of "double-run" 8 mm film. The processing laboratory bisects this film down the middle and returns it as single-run 8 mm film with a length double that shown on the original carton.

After it has run through the camera once, the film is only exposed on half its total width. To expose the other half:

Open the camera—Take both spools out of the camera, turn them other side up and reload.

The full spool will then be on the upper spool spindle (29) (with the side marked 'II' uppermost). When the film is fully exposed, the original Bolex spool (supplied with the camera) on spindle (29) will be empty again.

Unloading a partly exposed film.

If the operator wishes to remove a partly-exposed film from the camera and store it for subsequent re-use of the footage still unexposed, he should proceed as follows:

a) Unloading

1. Make a note of the footage counter reading; then set the frame counter to zero (see page 6).
2. Screw the dust cap on the lens.
3. Disengage the spring motor (by means of lever 12) and rewind the film in reverse motion (see page 9) until the figure '0' on the footage counter is exactly under the red dot.
4. Make an ink mark on the film through the taking aperture (can be reached by turning the lens turret, see page 11) and jot down the readings of both frame counter dials.
5. Finish winding back the film and unload the camera.

b) Reloading

6. Load the film into the camera as explained on page 4.
7. Press on the filming button, at the same time watching the footage counter carefully. Let go of the button as soon as the figure '0' appears slightly to the right of the red dot.
8. Watch the taking aperture (exposed by turning lens turret) and cause the film to advance frame by frame (lever 17 on 'T', see page 9) until the ink mark made on the film when unloading appears in the taking aperture.
9. Set the frame counter dials to the figures noted when the film was unloaded (see 4 above).
10. Screw the dust cap on the lens (now back in place over the taking aperture) and press the filming button until the figure jotted down when unloading appears on the footage counter and the frame counter again reads 'zero'.

The remainder of the film may now be exposed.

Lens Turret with Interchangeable Lenses

Bolex H cameras are made to take interchangeable lenses, the mounts of which are provided with an international standard thread and have the following characteristics:

H16 camera: 1" (25.4 mm) thread, distance from lens mount to film plane 17.52 mm.

H8 camera: 5/8" (15.8 mm) thread, distance from lens mount to film plane 12.29 mm.

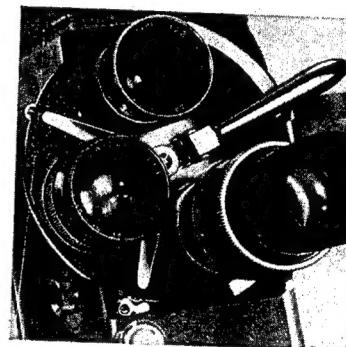
Thus the camera's optical equipment can always be completed by adding new lenses of different focal lengths.

Important: If you purchase any additional lenses later on, *do not omit to have them regulated to suit your camera by a Bolex distributor.*

The turrets of Bolex H cameras have room for 3 lenses, which must be screwed into their mounts securely, but without forcing them.

To bring a lens into the correct position for shooting, rotate the turret round on its axis by means of the turret handle. The latter is mounted permanently on the turret and can be folded down completely to save space.

The lens turret is provided with 3 click-stops which ensure that its position when fine focusing is to be done using the groundglass device is always accurate, no matter which lens is in front of the prism aperture (see page 17).



Octameter Viewfinder

(for Trifocal Viewfinder, see page 16)

The viewfinder is used for framing the scene to be filmed. The Octameter Viewfinder provides an accurate view of this scene exactly as it will appear subsequently on the screen, irrespective of whether a short- or a long-focus lens is being used for filming.

This is because the Octameter Viewfinder is designed so that its field of view can be regulated without any gaps, by continuous variation, to match the fields of lenses of all focal lengths from 16 mm to 150 mm in the case of the H16 camera, of from 6.5 mm to 75 mm in the case of the H8 camera. In addition, special field adapters, supplied separately, can be slipped into the front of the Octameter Viewfinder to obtain the field corresponding to lenses of focal length 10 mm (code: CADIS) for H16 cameras and 5.5 mm (code CAGLI) for H8 cameras.

Each viewfinder is carefully adjusted at the Works to suit the camera for which it is intended.

For movie-makers who wear glasses, special corrective lenses of various dioptric powers can be supplied for the Octameter Viewfinder on request. If you wish to have such a lens fitted to your viewfinder, get in touch with the Bolex distributor, stating the lens power required.

Instructions for use.

To fit the Octameter Viewfinder on the camera lid:

- Insert hinge pin (5) fully home in clamp (6) on the lid (Fig. 9).
- Lift up catch (7) and swing the viewfinder down until pin (8) has fully entered hole (9) in bracket (10).
- Push catch (7) fully down in the direction shown by the arrow; this locks the viewfinder firmly in position.

To remove the Octameter Viewfinder:

- Lift up catch (7).

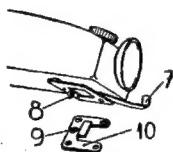


Fig. 12

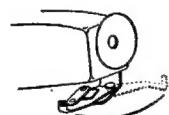


Fig. 13

- Lift up back of viewfinder to release pin (8).
- Twist the viewfinder down about a quarterturn towards the base of the camera, thus freeing hinge pin (5) from clamp (6) (Fig. 9).

Adjustment of viewfinder field.

This is done by rotating milled disk (11) in the appropriate direction.

The focal lengths corresponding to the various settings can be seen in the small window on the top of the viewfinder, and also appear in luminous figures when looking through the eyepiece (thus allowing adjustments to be made while continuing to observe the subject through the viewfinder) (see Fig. 14).



Fig. 14

The small pointers on the viewfinder aperture (Fig. 14) facilitate horizontal and vertical centering of the subject.

Correction of parallax effect.

The viewfinder is mounted on the camera lid in a position which entirely eliminates vertical parallax effect.

Horizontal parallax is compensated by turning knob (26), which is provided with a graduated scale, until the number corresponding to the shooting distance is facing the index mark (27). When filming extreme close-ups, this distance must be measured from the film plane (engraved line at front of camera, right hand side, see 1, Fig. 2). Set the scale on knob (26) to 'infinity' (∞) again when filming is over.

Trifocal Viewfinder

(may be supplied with certain H camera models) (Fig. 6)

Placing in position.

To place the viewfinder in position, turn ring D to make the red marks E coincide and insert the feet of the viewfinder into the clamps on the camera lid. Push the viewfinder fully home and fasten it in position by turning ring D in the direction shown by the arrow in Fig. 6.

To remove the viewfinder, simply reverse the above operations.

Correction of parallax effect.

The viewfinder is mounted on the camera lid in a position that entirely eliminates parallax effect. Horizontal parallax is corrected by displacing the viewfinder eyepiece F by means of the small milled screw G. The scale engraved above eyepiece F shows the position to which the eyepiece should be set according to the filming distance, measured between the subject and the film plane (engraved line on camera, identified as '1' in Fig. 2). Always return the eyepiece to the infinity (∞) position after using the camera.

Use with lenses of different focal lengths.

When levers H and J on the viewfinder are placed horizontally, the viewfinder is made ready for use with the standard-focus lens; the focal length of this lens is engraved on the front of the viewfinder, at K.

By raising or lowering levers H and J, the viewfinder is adjusted for use with either of the two other lenses on the turret. The corresponding focal length is engraved on each lever. The viewfinder front lens assembly K, comprising the lenses and levers, is interchangeable.

When purchasing a new set of lenses, therefore, the movie-maker can order a new viewfinder front lens assembly to match the 3 lenses which will henceforth be used on the camera. However, certain unusual combinations of focal lengths cannot be supplied.

Device for Critical Focusing on Groundglass

Bolex H16 Standard and H8 cameras are fitted with a totally reflecting prism which covers a large part of the subject, enabling fine focusing to be done on groundglass. This prism is mounted in the upper part of the turret mounting plate (see Fig. 15) and is protected from dust and jolts by a flat-headed screw which can be removed by unscrewing it with a coin.

The image transmitted by a lens placed in front of the prism is reflected by the latter onto the groundglass, where it can be conveniently observed through a removable eyepiece (see Fig. 15) or with the Eye-Level Focus (see page 19).

The groundglass focusing device is particularly useful for carrying out fine focusing of close-up subjects, for bringing telephoto lenses, as well as all lenses when used with the diaphragm wide open, into sharp focus, and also for checking depth of focus prior to filming.

Instructions for use.

- Turn the lens turret so as to disclose the prism aperture (Fig. 15) and unscrew protecting the prism.
- Turn the turret again so as to bring the lens to be focused in front of the prism.
- Open the lens diaphragm to its widest extent.
- Focus the lens until the subject seen through the removable eyepiece or Eye-Level Focus appears perfectly sharp.
- Place the focused lens in position for filming, in front of the taking aperture, and—being careful not to disturb the focusing—close the lens diaphragm to the appropriate stop for correct exposure.

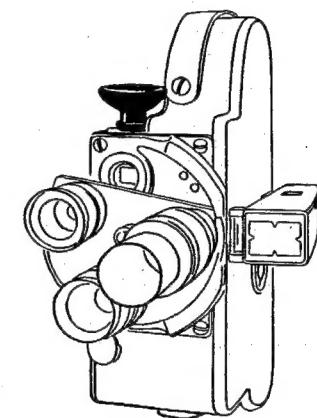
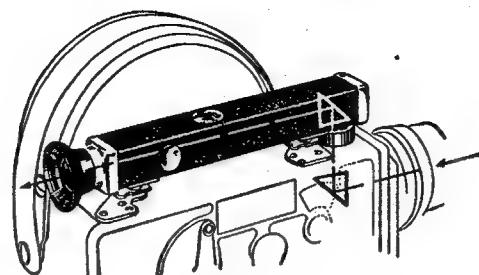


Fig. 15

Note.

When shooting subjects from very close at hand, use of the Parallax Compensator rackover device (Code RACKE, supplied as an accessory) is recommended. With this device, the lens can be made to take up exactly the same position with respect to the subject, when shooting is being done, as it occupies when framing and focusing are being carried out with the prism and ground glass.

Eye-Level Focus for Bolex H16 Standard and H8 Cameras



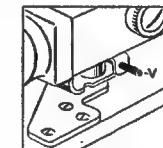
This attachment—available as an extra—adds to the convenience of the groundglass focusing device, by allowing the image formed on the groundglass to be observed from the back of the camera, vertically and in the same plane as the viewfinder. It provides a brilliantly clear, distortion-free image, magnified 10 times.

The Eye-Level Focus is made in two models: code "REFSE" for H16 Standard camera and code "REFTU" for H8 cameras.

Instructions for use.

If your Eye-Level Focus has been purchased separately, carry out operations A to F. If your camera was supplied with the Eye-Level Focus *already fitted*, only operations C to F need be undertaken.

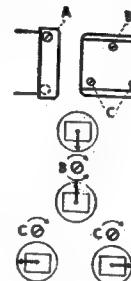
- A. Unscrew the mount containing the magnifier lens, located on the upper front part of the camera, and replace it by the special magnifier lens supplied with the Eye-Level Focus.
- B. Slide the Eye-Level Focus well home onto the mountings, so that its built-in prism exactly covers the new magnifier lens. Screw the retaining screw V into the rear mounting to lock the instrument securely in position.
- C. Unscrew the flat-headed screw covering the prism on the camera.



- D. Without placing a lens in front of the prism, adjust the Eye-Level Focus to suit your eyesight by turning the small milled knob in either direction until the grain of the groundglass surface appears clear and sharp when the camera is pointed towards the light. Once made, this adjustment will hold good whatever the lens in use, and need only be revised if your eyesight should undergo a change.
- E. Place the selected lens in front of the prism and bring the subject into sharp focus by adjusting the focusing ring, taking care that the lens diaphragm is fully opened, so that the brightest possible image is obtained.
- F. Place the focused lens in front of the taking aperture and set the diaphragm according to the prevailing light and selected filming speed (frames per second).

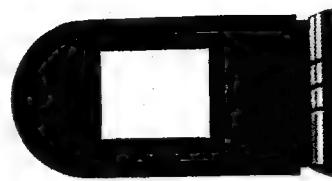
If the image seen through the Eye-Level Focus appears to be off centre or incomplete, the instrument can be adjusted, as follows:

- a) remove the metal cover A, which is held by two small screws;
- b) adjust centering of image in the vertical sense by slightly turning the small screw B, and in the horizontal sense by turning the two screws C in the directions shown by the arrows in the accompanying sketch.

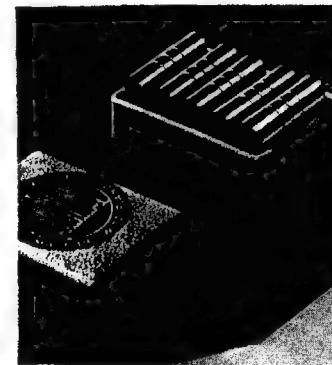


Filter Slot

Bolex H16 cameras are provided with a built-in slot to take gelatine filters. The filters are slipped into position behind the lens through a slot in the side of the turret supporting plate. Thanks to this arrangement, only a single set of filters is necessary, no matter what lenses are in use. A filter slide is furnished for each gelatine filter.



When shots are being made without a filter, the empty filter slide supplied with the camera must be left in the slot to prevent light entering the camera and fogging the film.



The set of filters especially designed for the Bolex H16 camera comprises:
5 filter slides in a plexiglas case
5 small bags each containing one 2" x 2" filter, as follows:

1 Kodak Wratten 1A Skylight filter
1 " , 85 Daylight filter
1 " , 8K2 yellow filter
1 " , 15G yellow-orange filter
1 " , 25A red filter.



Instructions for use of gelatine filters.

Warning! Handle the gelatine sheets or ready cut-out filters carefully by picking them up at the edges, as fingerprints, once made, cannot be removed.

The filters are prepared as follows:

1. Remove the cylindrical clamp fastening the filter slide together, separate the two side plates and take out the spring clamp that retains the filter in position.
2. *Without removing the protective paper covering*, cut out a rectangle, size 18 mm x 15 mm in the gelatine sheet, using a pair of sharp scissors.
3. Gently insert the filter just cut out into the rectangular recess in the plate. Lay the spring clamp on the edge of the filter and fit on the second plate. Then fix the fastening clamp in position.

Always keep the mounted filters in their case, away from dust, when not in use.

Filters for black-and-white films.

Wratten filters 8K2, 15G and 25A are intended to heighten the contrast between different colors, translated on the film as various shades of grey. When these filters are used, the diaphragm aperture must be increased, as compared with the normal reading shown on the exposure meter, by the following amounts:

1 stop	for Wratten filter 8K2 yellow
1.5 stops	" 15G yellow-orange
2.5 stops	" 25A red

The effect produced by a filter varies according to the make and sensitivity of the film and to the prevailing lighting conditions. The correction factors just quoted are therefore not absolute, but merely serve as an approximate guide.

Filters for color films.

The "Skylight" filter is used to attenuate exaggerated blue overtones and to improve rendering of colors in shots made in the shade or under overcast skies, in views of far-off landscapes, and snow or high-altitude scenes. No correction of the diaphragm is needed when this filter is in use.

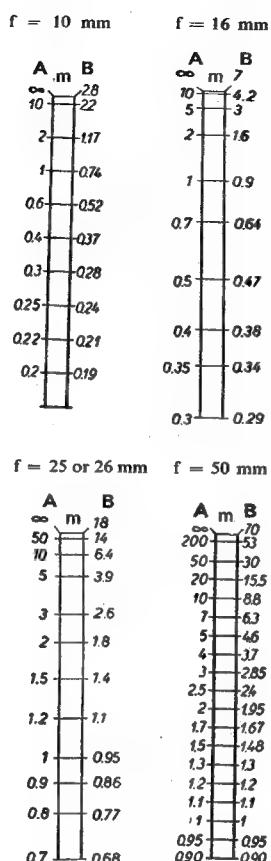
The "Daylight" filter is a conversion filter, and is used for shooting films in daylight with Kodachrome Type A film intended for artificial light. In setting the diaphragm, account must be taken of the fact that color film designed for artificial light, when used with the "Daylight" filter, has the same sensitivity as daylight-type color film used without filter.

Correction of focusing:

The fact of placing the filters behind the lens slightly alters the focusing setting for a given distance. The diagrams opposite show the positions to which the focusing rings of Kern-Paillard 10 mm, 16 mm, 25 mm, 26 mm and 50 mm lenses must be set to obtain perfectly sharp pictures, *no matter which filter is used*.

E.g. For a filming distance of 10 ft., the Yvar 16 mm's focusing ring should be set to 7 ft. On the other hand, the available depth of field will still correspond to that for a shooting distance of 10 ft., i.e. 4.8 ft. to infinity, if the diaphragm is set to $f : 2.8$.

This correction is only required at apertures from $f:1.4$ to $f:2.8$; furthermore, it should be noted that in the case of the telephoto lenses and of the Pan Cinor 16 mm lens, a correction is, practically speaking, not necessary.



A = Filming distance measured from
Filmplane.

B = Distance to be set on the lens scale when using a slide-filter.

Lenses

Standard lenses.

These lenses are most generally used and will be found suitable in the majority of circumstances.

H16 camera : focal length 1" (25 or 26 mm).
H8 camera : focal length $\frac{1}{2}$ " (12.5 or 13 mm).

Wide-angle lenses.

These lenses are used in cases when the moviemaker wishes to shoot a wide general view of the scene in which the action is taking place, or when obstacles in the way prevent him from moving back far enough to obtain a good view of a given subject (such as a monument or other building, or an indoor scene).

H16 camera : focal length 10 to 16 mm.
H8 camera : focal length 5.5 to 7 mm.

Telephoto lenses

These lenses are used to obtain near or close-up views of subjects of all kinds, such as sporting events, wild life scenes, architectural details and so on, which have to be shot from some distance away.

H16 camera: focal length 2" to 6" (50 to 150 mm).

H8 camera: focal length 1" to 3" (25 to 75 mm)

Owing to the additional brightness generally prevailing in distant views the diaphragm should be stopped down one half or one stop lower than the setting one would use with a normal-focus lens. The following filters will be found useful as a means of reducing the effect of atmospheric haze:

Wratten 1A or Kodachrome
Ansco UV-16 for Anscocolor
Agfa UV-K29 C for Agfacolor
Orange for black-and-white film.

Notice: The BAGOM adapter ring permits the use of KERN-PAILLARD lenses, intended for the H16 camera, on the H8 camera. When used on an 8 mm camera, a 16 mm type lens gives the same size of image as that of an 8 mm lens of the same focal length, however halving its field of view.

Shooting a film

When the camera has been loaded and the 'leader' has been run through (i.e. cipher 0 appears against red pointer on footage counter), shooting can begin. The various operations entailed should be carried out in the following order:

1. Wind up the motor.
2. Select an appropriate shooting angle, adjust the field of the viewfinder according to the amount of subject-matter which is to be included in the scene, and correct parallax, depending on the shooting distance.
3. Set the lens with a focal length corresponding to that indicated by the viewfinder in the shooting position, opposite the taking aperture.
4. Set the diaphragm and focusing controls on the lens.
5. Adjust the filming speed as required.
6. Make sure that the camera is being held quite steady, then start shooting.
7. Keep a check on the length of the 'take'.

Some general principles.

- Do not forget that movie-making is the art of expressing motion. Therefore, shoot moving subjects rather than still-life views.
- Always hold your camera absolutely steady. If you must follow your subject about, do so smoothly and with the minimum amount of motion.
- "Pan" shots should only be resorted to occasionally, as when viewed on the screen, they are tiring to the eyes.
- In selecting a shooting angle, do not forget to take into account the direction in which the subject will move. Avoid shots in which the subject moves straight across the field of view; instead, try to shoot from an oblique angle.

- Do not hesitate to alter the shooting distance and angle (e.g. from above or below) frequently. Such changes will make the scenes shot more vivid still.
- In framing your scenes, always take care that the main subject is kept in the centre of the viewfinder.
- Never shoot two different actions simultaneously, and whenever possible avoid shooting scenes from too far away.

Winding.

One complete winding of the motor is sufficient for about 17 ft. of film (H16) or 10 ft. of film (H8).

However it is advisable to wind up the motor after every take, no matter how short. The operator will thus avoid the disagreeable surprise of finding that the motor has stopped in the middle of a shot.

Setting the diaphragm.

The amount of light which reaches the film after passing through the lens is limited by the aperture of the diaphragm. The smallest number on the scale corresponds to the widest setting of the diaphragm. The graduations on the diaphragm scale are known as 'stops'. When the diaphragm is closed by one stop (e.g. by altering the setting from f: 5,6 to f: 8), the amount of light reaching the film is halved. Conversely, opening the diaphragm by one stop (e.g. from f: 8 to f: 5,6) doubles the amount of light admitted. Opening the diaphragm by two stops quadruples it, and so on.

In determining the correct stop to use, three main factors must be taken into account:

- the intensity of the lighting,
- the sensitivity of the film,
- the filming speed.

Exposure table.

Correct exposure of the film has a determining influence on picture quality. As a guide for the novice, the Bolex exposure table supplied with the camera indicates the diaphragm stops which should be used under the lighting conditions most usually encountered.

Exposure times corresponding to filming rates from 8 to 64 f.p.s. and to single-frame shots are shown at the back of the table.

Exposure meters.

Photoelectric exposure meters help the operator to determine the diaphragm stop which should be used under various lighting conditions. They are suitable for both black-and-white and color films. Depending on the model, they measure either incident or reflected light. The movie-maker is strongly advised to acquire one of these very useful accessories.

Distance focusing.

Particular care must be taken in focusing when the distance is short, or when a scene is being shot with the lens diaphragm wide open, as in such cases the depth of field available is very small.

First determine the distance to the nearest and farthest points between which the action of the scene is likely to take place.

Then set the focusing scale to an intermediate value which falls well within the 'zone of sharp focus' as indicated by the automatic depth-of-field scale on the lens, so that the anticipated action takes place within this zone.

If the lens is not provided with an automatic depth-of-field scale, the required data for focusing can be obtained by consulting a depth-of-field table corresponding to the lens characteristics.

Stability of camera.

The camera should always be held absolutely steady while shooting is in progress.

The slightest jolting of the camera will be amplified many times over when the film is projected, making the subject appear to dance about on the screen. Hold the camera pressed fast against the eye-brow ridge, if possible leaning the elbows at the same time against some stable object (such as a wall or tree-trunk). Aim the camera slowly and smoothly, without jerking and without rocking the body.

Use of the Bolex "Surefire Grip" (supplied separately) is recommended.

A tripod is indispensable when shooting with a telephoto lens. Use the Bolex Pan Head Tripod (code: PODOM) which ensures perfect stability at all shooting angles.

Length of takes.

The length of a take depends on the amount of action involved in the scene, and must be determined by the movie-maker. An average take at 16 frames per second usually lasts some 5 to 8 seconds (i.e. about 3 'clicks' of the audible counter).

Although the length of a take can be prolonged somewhat if the action demands this, sequences of exaggerated length tend to detract from the interest of the scene.

It is always possible to shoot lengthy action scenes while remaining within reasonable limits. This can be done very easily by merely altering the shooting angle and/or distance for each take.

Hints on Filming Technique

Black-and-white films.

Black-and-white film has the advantage of remaining comparatively unaffected by fairly wide variations in exposure. Thus on each image the details of the darker and lighter parts of the subject are rendered equally well.

The movie-maker enjoys unhampered freedom as regards filming technique, and all kinds of lighting effects: contrasts between light and shade, shots against the light and nocturnal scenes, are within his grasp. Furthermore, emulsions of various degrees of sensitivity are available, which is not the case with color film.

Color films.

Color films are just as easy to shoot as black-and-white-ones. However, since color film is more sensitive to small variations in exposure, the diaphragm stop should be determined by using a photo-electric exposure meter.

In composing the scene, the movie-maker should avoid deep shadows; *the colors themselves already lend contrast to the scene.*

To counteract the prevailing blue tone produced by shadows, particularly in far-off scenes shot under a cloudy sky, use the Wratten 1 A filter for daylight type Kodachrome film, or the Ansco UV-16 filter for daylight type Anscocolor film, or the Agfa UV-K 29-C filter for daylight type Agfacolor film.

See the special catalogue of Bolex filters and mounts.

Indoor scenes.

To shoot indoor scenes in daylight, use a fast lens (i.e. one with a wide aperture) and a supersensitive film. Choose your setting so as to make the best possible use of what light there is.

Only flood-type reflectors are suitable for shooting indoor films, in black-and-white or in colors, by artificial light.

The amount of exposure required by the subject varies considerably according to the way the reflectors are laid out (i.e. according to whether

the subject is lit up from in front, from the side or from behind). The lighting arrangements should be modified to suit the character of the scene to be shot. To determine the correct diaphragm stop to use, consult an exposure table for artificial light, or rely on a good-quality exposure meter.

"Pan" shots.

When panoramic views (such as broad landscapes, mountain chains, or architectural views) are being shot, the camera should be moved *slowly and smoothly*, care being taken to hold it absolutely steady, so as to avoid any impression of jerkiness on the screen. As an example, a sweep which involves an alteration of 90° (i.e. a quarter-turn) in the shooting angle should take about 20 seconds.

Introduce the sweep with a steady shot, and finish it off with another steady shot at the end. It is best to set the camera up on a tripod, as this makes for smoother 'pans' and steadier pictures. Any tendency towards jerky movements can also be diminished by shooting at a higher filming speed than usual, say 24 or even 32 frames per second instead of 16 (needless to say, however, this method should only be applied to motionless subjects, such as landscapes).

Single frame exposures.

Single frame shots (snapshots) are used mainly for making animated cartoons. This technique, however, can be applied both to still and to moving subjects.

Moving subjects.

Set the camera up on a tripod and, using a cable release, take a series of single frames at a regular and fairly rapid rate (say about 2 or 3 frames per second). On projecting, the subject will appear to move much faster than usual. Some highly comic effects can be obtained in this way.

Subjects whose movements are too slow to be perceived by the naked eye.

Extremely slow motion (such as the growth of a plant) can also be registered in this way.

The camera must be fixed on an absolutely rigid support. The shutter should be operated at regular intervals, using a cable release. The frequency with which shots are taken will depend on the type of subject involved and the effect required. The lighting should remain constant for each shot. It follows from this that the use of flood-type lighting will be found well-nigh indispensable.

Still subjects.

In order to make pictures in which still subjects appear to be in motion, it is sufficient to move the latter about or to alter their shape or position from one exposure to the next. This should be done in such a way that the resulting apparent motion follows a definite, easily-grasped pattern, and does not give rise to a disjointed or incoherent effect on the screen. The camera should preferably be set up on a tripod or other steady mount. The cable release should be used and succeeding shots should be made under identical lighting conditions.

This technique can be used for imparting motion to dummies, puppets etc. The same procedure can also serve for animating drawings, designs, graphs, movie titles and so on. Care should always be taken in such cases to distribute each movement of the object concerned over a sufficient number of frames, to ensure a smooth transition.

Time exposures.

Certain kinds of still-life subjects may be shot one frame at a time, using time exposures, when the light is exceptionally poor (interior views of churches and museums, paintings, architectural details, nocturnal views and so on).

The camera must be set up on a tripod, the diaphragm set according to the depth of field required, and the camera operated by means of the cable release, which must be pressed down for the length of time needed to expose each frame correctly.

Fades.

These are made by causing the subject to appear or to disappear progressively. In a 'fade-in', starting from a completely black background, the picture appears gradually brighter and brighter until it reaches its

normal value, while inversely, in a 'fade-out', the picture gradually gets darker and darker until a point of complete black-out is reached. These effects, which are often much more pleasing to the eye than a sudden change of scene, are obtained by progressively increasing or reducing the amount of light admitted to the film.

Use of the lens diaphragm.

If the scene is being shot at an aperture greater than f: 5.6, a 'fade-out' can be produced very simply by merely closing the diaphragm at a steady rate while shooting is in progress (to produce a 'fade-in', start with the diaphragm stopped fully down and open it gradually).

If lighting conditions do not permit of this, place a neutral density filter over the lens and open the diaphragm sufficiently to compensate for the light absorbed by this filter.

The diaphragm cannot be closed entirely. Therefore cover the lens with the hand before starting a 'fade-in', or at the end of a 'fade-out'. A fade usually lasts about 3 seconds.

Totally-closing iris diaphragm.

This is an attachment which, when mounted in front of the lens, acts as a mask with a round opening, the size of which can be altered at will. The extent to which the iris is opened or closed governs the amount of the subject that can be seen. The diaphragm can be closed gradually at will until it is completely shut.

Lap dissolves.

Whereas fades are used to mark a distinct break between one shot and the next, lap dissolves serve to link up successive scenes, the outlines of which may either melt into one another or appear in sharp contrast, depending on the effect desired.

Lap dissolves are produced by superimposing a 'fade-in' over a 'fade-out'. As the first scene vanishes, the second gains substance. Success in producing this illusion depends entirely on the extent to which the two fades are shot at the same rate and for the same duration (which should be about 3 seconds, i.e. 48 frames at 16 frames/sec. for black

and white film, or 1½ to 2 seconds, i.e. 24 to 32 frames at 16 frames/sec., for color film).

- First, make a note of the frame counter reading.
- Then shoot the 'fade-out' of the first scene.
- Next, put the stopper on the lens and crank the camera in reverse motion for the number of frames corresponding to the 'fade-out', i.e. until the frame counter again registers the reading first noted.
- Remove the stopper from the lens.
- Start the camera running again and shoot the 'fade-in' for the next scene.

Lap dissolves can be produced by closing and then opening the camera diaphragm, by using a totally-closing iris diaphragm or by inserting masks (such as opaque screens of increasing and decreasing density) in front of the lens.

Upkeep

Lenses.

All the outer surfaces of the lenses should be kept absolute clean. To clean them, use the special soft tissue-paper sold in photo stores. The lenses should not be constantly rubbed, as this might damage the anti-reflex coating.

Put the dust-caps on the lenses between scenes, and when the camera is no longer needed, stow them away from damp in their Paillard-Bolex cases. Special care should be taken to avoid dust or fingerprints getting into the glass surfaces (perspiration is harmful to glass).

Camera.

The interior of the camera, in which the entire film transport mechanism is housed, must be kept absolutely clean.

A certain amount of gelatine and dust is generally left in the gate and on the pressure-pad after some length of film has been run through. Such deposits should be removed, as follows:

- Open the pressure-pad by shifting pin (33).
- Unscrew the milled knob retaining the other end of the pressure-pad and withdraw the pressure-pad by pulling it towards you.
- Using a clean cloth twisted around the end of a small wooden stick, clean the pad and gate gently, particularly around the taking aperture. If the gelatine deposit is 'tacky' and hard to remove, moisten the cloth slightly, wiping off the place carefully afterwards to ensure that it is dry.
- Put the pressure-pad back in place.

3

Lubrication.

Like a high-quality watch, the Bolex H camera rarely needs to be lubricated. When new, it contains a reserve of grease and oil sufficient to last for 2 or 3 years. When this length of time has elapsed, it is advisable to turn the camera in for fresh lubrication to the nearest Paillard-Bolex distributor.

Under no circumstances should any attempt be made to dismantle the camera mechanism.

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Use and care of camera in tropical climates.

Certain precautions must be taken to protect both camera and film against heat and damp when living or travelling in tropical regions. Airtight boxes (tropical pack) for storing film spools are available on the market. The film should only be left in the camera proper for the amount of time required to expose it.

The camera and all its accessories should be cleaned thoroughly and frequently. The leather lining and carrying cases should be treated with a special protective chemical (such as Septatan, Tymol and so on). To prevent hot, moist air from condensing and giving rise to bacterial growths in or on the equipment, the latter should not be stowed away in its various cases between takes, but should be freely exposed to the air.

On the other hand, when the equipment is to be left unused for some time, particularly during the monsoon season, it should be protected by putting it away in airtight tins, into which a suitable desiccating agent (such as silicagel, calcium chloride and so on) has been placed. These chemicals should not be used too liberally, however, in order to avoid excessive drying, which might damage the leather or the film. A relative humidity of 35 to 40% is quite acceptable. Care should be taken to avoid dropping any of the chemical onto the equipment.

Camera identification number.

Should you exchange any correspondence with your supplier on the subject of this camera, please do not omit to mention this number, which will be found inside the camera casing (with lid removed) and underneath the lens turret (swing turret round to disclose number).

Servicing and Repairs.

Before going on a trip abroad, take care first to obtain from your usual dealer a list of the official Bolex distributors in the countries that you intend to visit. If your camera should require servicing at any time, contact the Bolex distributor in the country you are visiting. Remember —only an official Bolex distributor is qualified to undertake repairs to your camera. If you allow repairs to be made by other persons without the specific authorization of a Bolex distributor, you forfeit your right to the maker's guarantee.

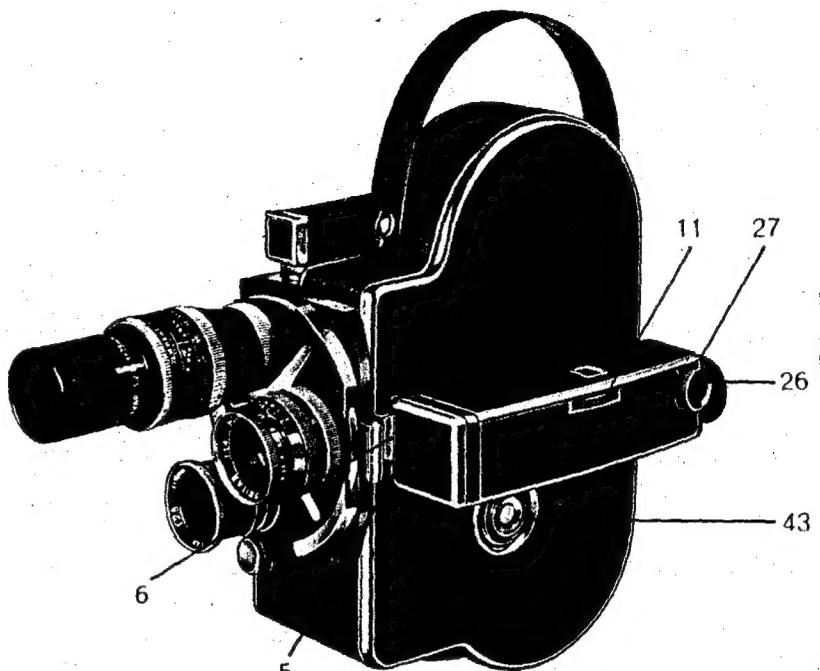


Fig. 9

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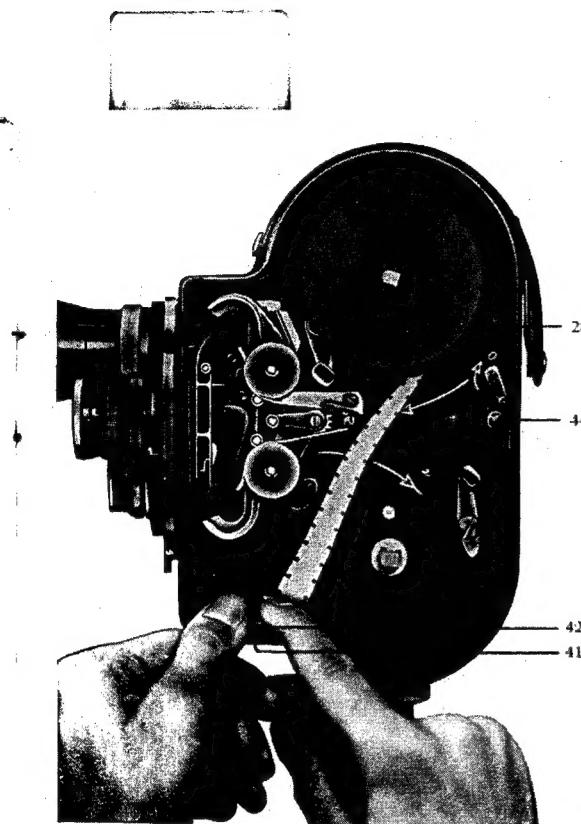


Fig. 5

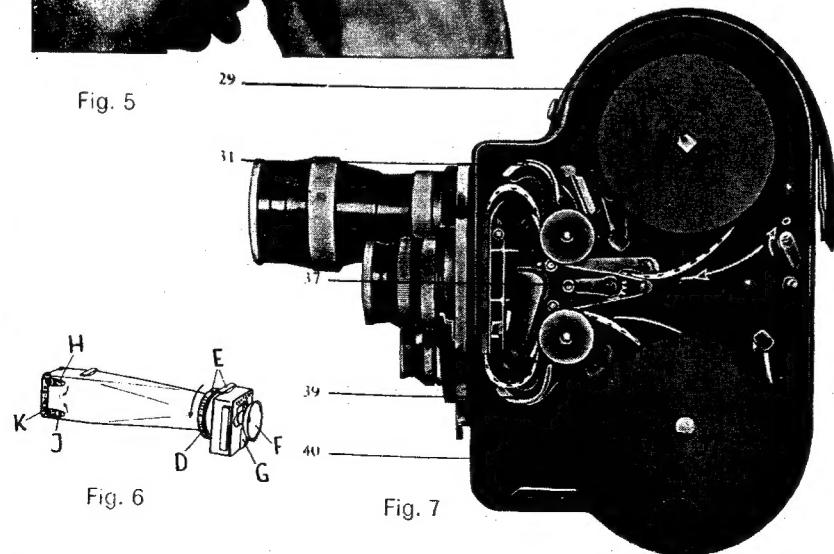


Fig. 6

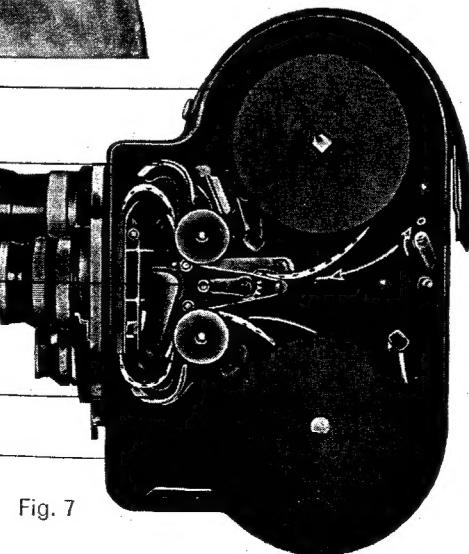


Fig. 7

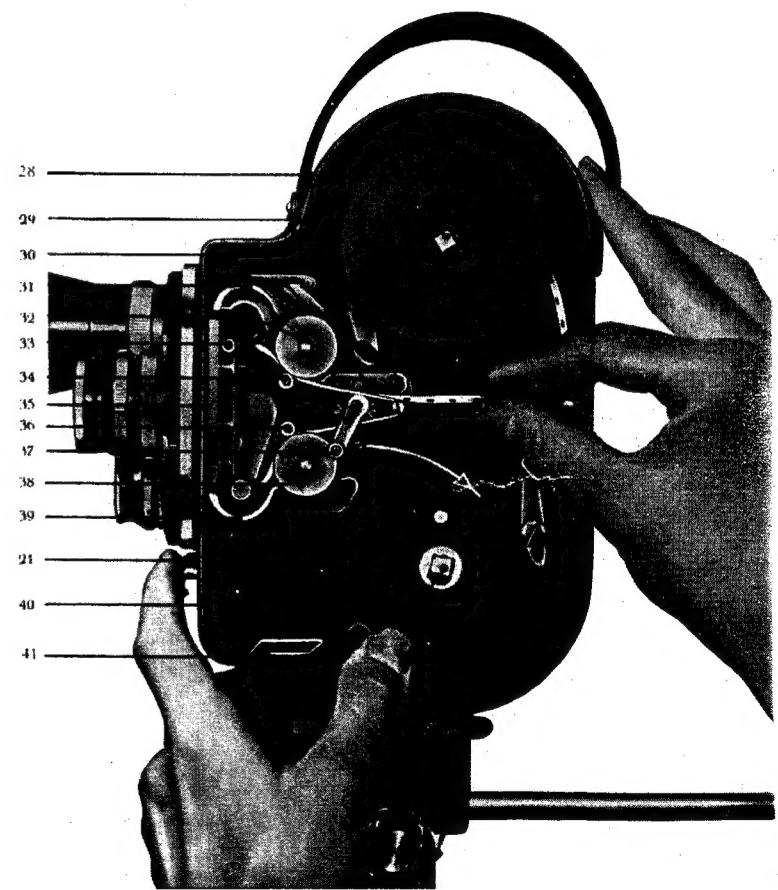


Fig. 8